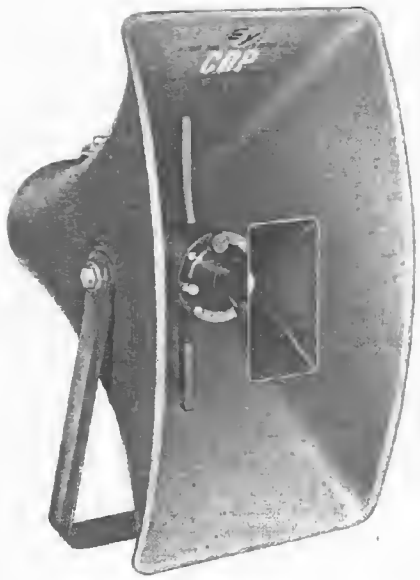
MODEL 848 COMPOUND DIFFRACTION PROJECTOR



FEATURES

- Precisely controlled dispersion
- Patented CDP principle assures higher intelligibility through drastic reduction in distortion
- Fiberglass construction-impervious to weather

DESCRIPTION AND APPLICATIONS

The Electro-Voice Model 848 Compound Diffraction Projector is a wide-range, integrated horn and driver system using a single driver unit with two coaxially mounted high and low-frequency horns coupled to opposite sides of a single diaphragm. Thc bell of the 848, fabricated of fiberglass and polyester resin, identical to the Electro-Voice Model FC100 projector horn, provides an extremely strong, lightweight housing. By use of the exclusive Electro-Voice compound diffraction principle, maximum sound pressure level, with minimum distortion, and the greatest possible intelligibility for speech or music transmission is achieved.

High efficiency and low distortion of the Model 848 are inherent characteristics of the compound diffraction principle of design. The compound horn is actually two horns in one. A large horn designed to reproduce tones below 1000 cps is coupled to the rear of the driver diaphragm. This horn reproduces these low tones with high efficiency but will not reproduce tones above 1000 cps. A small horn coupled to the front of the diaphragm is designed to reproduce only the tones above 1000 cps. This combination of two horns means each horn can be designed to reproduce its own range of frequencies without compromise. The result is extraordinarily smooth, peak-free response throughout the entire useful voice and music range. Use of the compound principle in horn design results in a dramatic reduction of distortion--particularly at high frequencies. When very high frequencies are reproduced through a horn designed for low frequencies, distortion is the inevitable result, particularly at high power levels. By dividing the range and using two horns, distortion is drastically reduced, insuring greatest fidelity or reproduction for voice and music. Actual distortion of the Model 848 with 30 watts power input measures only 1%. A typical measurement for any type reentrant horn under similar test conditions will show distortion in excess of 10%. In terms of intelligible sound at a given point, an improvement in the distortion figure will radically improve the actual efficiency factor of the unit.

SPECIFICATIONS

Frequency Response:	150 to 10,000 cps
Sound Pressure Level:	117 db (at 4' with 30 watts input between 750 and 1250 cps)
EIA Pressure Rating:	55 db
Power Handling Capacity:	
Program Material:	30 watts
Peak:	60 watts
Nominal Impedance:	8 ohms
Acoustical Crossover:	1000 cps
Low-Frequency Horn Taper:	100 cycles
Dispersion:	90° (horns mounted horizontally) 120° (horns mounted vertically)
Mounting:	Universal "U" bracket
Size:	10-1/2" w x 20-1/2" h x 20" d
Weight:	15-1/2 pounds net

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INSTALLATION

The CDP is shipped assembled and ready for use. The transmission line may be connected directly to terminals T1 and T2 on the driver unit. But, for a neater and stronger connection, it is recommended that the line be fed through the grommet at the rear of the large bell and the hole in the cross bracket. To install the line in this manner, follow these steps:

1. Bend the end of the cable so that it is shaped into a semicircle about one inch in diameter.
2. Insert the cable end through the grommet so that the end will pass outside the large phenolic tube.
3. Reach into the front of the horn, grasp the cable and pull it forward.
4. Tie a knot in the cable to act as a strain relief against the grommet.
5. Feed the cable through the hole in the cross bracket and fasten the two leads to terminals T1 and T2.

The CDP has a nominal impedance of 8 ohms. When two or more units are connected in parallel, for proper phasing all the terminals coded T1 should be connected to one side of the line and all terminals coded T2 should be connected to the opposite side. For series operation, the T1 terminal of one unit should be connected to the T2 terminal of the next and so forth.

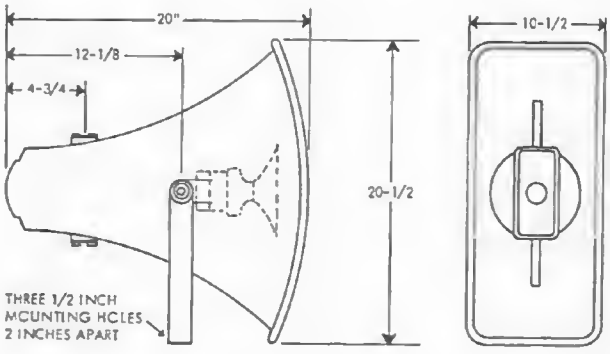


Figure 1 - Dimensions

MULTIPLE SPEAKER CONNECTIONS

Figure 2 shows how two or more CDP units may be connected in series. The individual impedances are additive; thus, the total impedance for the circuit shown is 16 ohms and should be matched to a 16-ohm tap on the output transformer if one is provided. Figure 3 discloses the solution where only 4- and 8-ohm taps are provided. When using two CDP's in this case, they should be parallel, thus permitting a 4-ohm load impedance to be connected to the 4-ohm tap on the output transformer with a perfect match.

Quite frequently it is necessary to series-parallel a large number of speakers in order to arrive at a proper amount of total impedance to equal the impedance tap available on the output transformer. When two or more sections or groups of CDP speakers are connected in parallel, totaling different impedances for each group, the following formula may be employed to determine the proper tap to use on the output transformer:

$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \ldots + \frac{1}{R_N}$$

Where R_t = total impedance

$R_1, R_2, \ldots R_N$ = individual impedances of various units or groups of units.

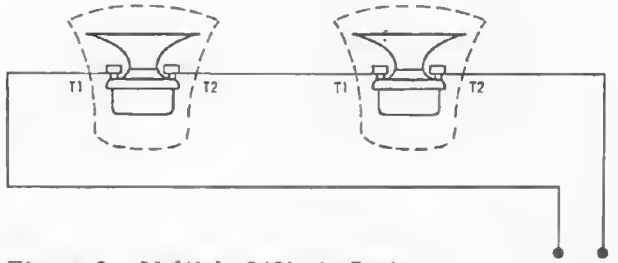


Figure 2 - Multiple 848's in Series

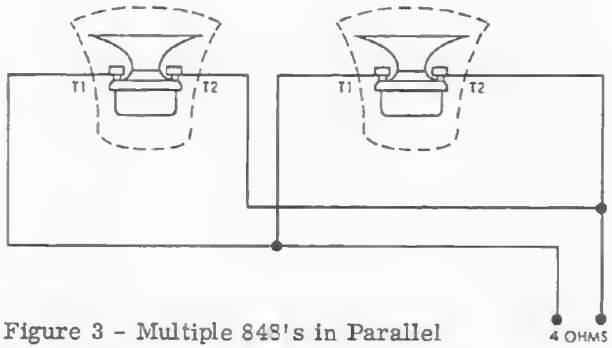


Figure 3 - Multiple 848's in Parallel

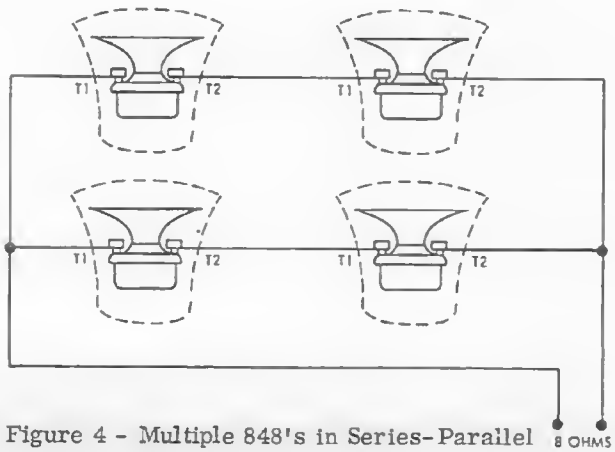


Figure 4 - Multiple 848's in Series-Parallel

FREQUENCY RESPONSE

The CDP has an extended high-frequency response. This makes it especially useful for highly intelligible speech reproduction. The smoothness of the response characteristic permits higher levels of reproduction without feedback, since there are no high peaks which will trigger and sustain feedback. In very reverberant rooms, however, it may be necessary to reduce the amplifier bass response when reproducing at high volume levels to eliminate feedback caused by room resonances.

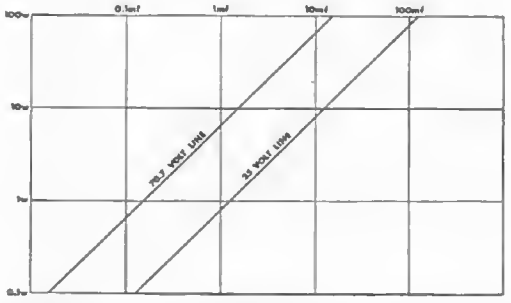
LOW FREQUENCY DRIVER PROTECTION

When frequencies below the low-frequency cut-off for the horn assembly are fed to the driver, excessive current may be drawn by the driver. For protection of driver, amplifier, and transformer (if driver with built-in transformer is used), capacitor(s) in series with driver, or transformer primary, are recommended. The following tables indicate recommended values. Values shown are for 200 cps. Values for other frequencies can be determined by using the formula: $C = C_{200} \frac{(200)}{f}$

C_{200} = Values shown in the following tables

f = New frequency

For drivers without transformers:
8 ohm driver, 25 wv - 100 uf
16 ohm driver, 50 wv - 50 uf



Series capacitors for driver protection below 200 cps. For drivers with line transformers.
NOTES: 1. Read value from chart. Use next larger commercial value.
2. For frequencies other than 200 cps, C=C200 $(\frac{200}{f})$

Figure 5-Driver Protection Chart

Series capacitors for 200 cps and below driver protection:

	70 volt lines		25 volt lines	
60 w	83	10 mf	10.4	80 mf
30 w	166	5 mf	20.8	40 mf
15 w	333	2 mf	41.6	20 mf
8 w	625	1 mf	78	10 mf
4 w	1,250	0.5 mf	156	5 mf
2 w	2,500	0.25 mf	312	2 mf
1 w	5,000	0.1 mf	625	1 mf
1/2 w	10,000	0.05 mf	1250	.5 mf

150 v. DC or 150 v. non-polarized elcctrolytic, or 2 150 v. DC electrolytics of 2 times required value in series, back to back, for 70 volt lines.

50 v. DC or 50 v. non-polarized electrolytic, or 2 25 v. DC electrolytics of 2 times required value in series, back to back, for 25 volt lines.

CONSTANT LOUDNESS CONTOURS

The accompanying figure indicates the distance you can stand from the 848 when it is operated at half rated power to achieve a typical sound level of 90 decibels. Unlike the polar pattern, the graph is plotted in distance. The constant loudness contour is measured at about 3000 cps to assure that full articulation of speech is achieved anywhere on or inside the contour line. This does not mean that there will be no sound outside the constant loudness contour line, but merely that the loudness at 3 kc will be below 90 db and intelligibility may suffer. Reference to the polar pattern will indicate the relative loudness of other frequencies at any point. The nominal dispersion of the speaker is based on the loudness "balance" of all frequencies at various angles. This is a subjective measurement and may vary with individual applications.

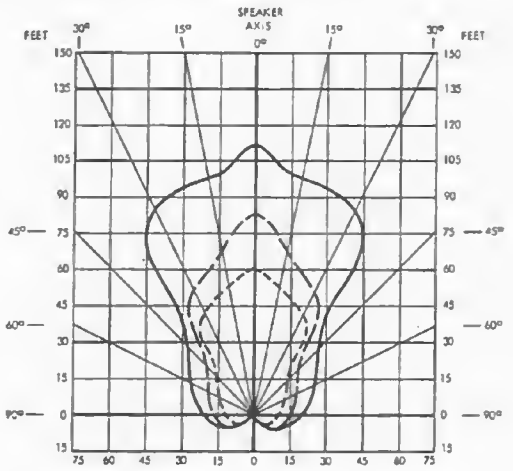


Figure 6-Constant Loudness Contour

Although a 90 db reference level has been selected some other sound level may be required. The following table gives the conversion factor for several other levels. For sound level of:

60 db multiply distance by:	32.0
70 db	10.0
80 db	3.2

For sound level of:

100 db divide distance by:	3.2
110 db	10.0
120 db	32.0

For sound pressure level of 90 db at full rated power multiply distance by 1.4

Two useful formulas can help you to use these charts and specifications.

1. Every time you double amplifier power into a driver, the sound pressure level at any point will be increased by 3 decibels. Conversely, if amplifier power into the speaker is cut in half (from 30 watts to 15 watts, for instance) the sound pressure level will be reduced by 3 decibels.

2. Every time you double the distance from the listener to the speaker, the sound pressure level at the listener will be reduced by 6 decibels. This is equivalent to having only 1/4 the amount of power available at the more distant position.

NOTE: The above statements refer to outdoor systems where no sound reinforcing reverberation affects the efficiency of the system. On indoor sound systems, reflections from walls will tend to reinforce the sound level thus reducing the effects noted above. The smaller the room, the less effect distance will have on loudness. Highly reflective wall surfaces (i.e. tile, glass, stone, etc.) will further reduce the loudness difference. These reflections, however, may reduce intelligibility by creating a "garbled" or echo effect.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker shall have a uniform frequency response from 150 cps to 10,000 cps. EIA sensitivity rating shall be 55 db. Sound pressure level measured at 4 feet on axis with a tone warbled between 750 and 1250 cps with 30 watts input shall be 120 db. Net weight shall not exceed 15-1/2 lbs. The Model 848 shall have a yoke type of mounting suitable for use with standard pipe fittings. Dimensions shall be 10-1/2" w x 20-1/2" h x 20" d.

An adjustment for sound dispersion shall be incorporated permitting tones above 1000 cycles to be confined in a beam of 120° or 90°. An adjustment of the beam for tones below 1000 cycles shall be possible by turning the outer horn vertically or horizontally for 120° or 90° dispersion respectively. The high-frequency horn shall be capable of a rotation of 90° within the low-frequency horn for separate control of high-frequency dispersion.

The removable driver shall have a nominal impedance of 8 ohms. The terminals shall be phased. The low-frequency air column length shall be a minimum of 58 inches. The Electro-Voice Model 848 is specified.

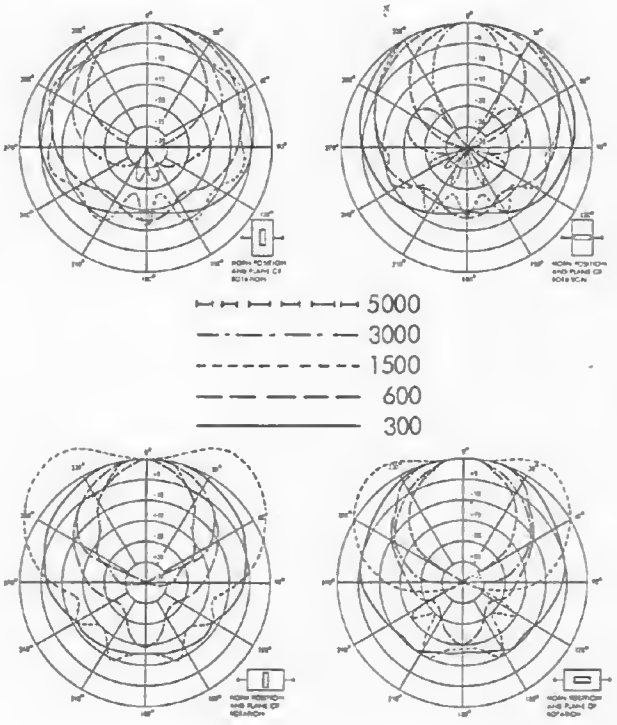


Figure 7-Polar Patterns